WHAT IS CLAIMED IS:

1. A method of manufacturing a semiconductor device comprising:

forming a semiconductor on an insulating surface;

forming a first insulating film on the semiconductor;

forming a gate electrode on the first insulating film;

doping the semiconductor with an impurity element that gives one conductivity type to form a first impurity region;

doping the semiconductor with an impurity element that gives an opposite conductivity type using a mask formed on the semiconductor in order to form a second impurity region in the semiconductor;

forming a second insulating film on the first and second impurity regions;

forming contact holes in the second insulating film so that the contact holes reach the first and second impurity regions;

forming a metal film so as to cover the contact holes;

forming from the metal film wiring lines that are connected to the first and second impurity regions, and then removing a part of the metal film; and

forming an amorphous semiconductor to be brought into contact with the first and second impurity regions where the metal film is removed, wherein the amorphous semiconductor is a photoelectric conversion layer of the photoelectric conversion element.

2. A method according to claim 1, wherein the one conductivity type is n type.

3. A method according to claim 1, wherein the one conductivity type is p type.

4. A method according to claim 1, wherein the semiconductor device is at least one electronic equipment selected from the group consisting of a sensor, a scanner, and a copy machine.

5. A method according to claim 1, wherein the semiconductor device is at least one electronic equipment selected from the group consisting of a video camera, a digital camera, a laptop computer, a portable information terminal, a mobile computer, a mobile telephone, a mobile game equipment, and an electronic book.

6. A method of manufacturing a semiconductor device comprising:

forming a first semiconductor on an insulating surface;

forming a first insulating film on the first semiconductor;

simultaneously patterning the first semiconductor and the first insulating film to form a plurality of second semiconductors and a plurality of second insulating films;

forming a third semiconductor on the second insulating films;

patterning the third semiconductor while using the second insulating films as etching stoppers to form at least one fourth semiconductor;

forming a third insulating film on the second and fourth semiconductors;

forming a plurality of gate electrodes only on the third insulating film that is in contact with the second and fourth semiconductors;

doping the second and fourth semiconductors with an impurity element that gives one conductivity type to form first impurity regions; and

doping the second and fourth semiconductors with an impurity element

that gives an opposite conductivity type using masks formed on the second and fourth semiconductors in order to form second impurity regions.

7. A method according to claim 6, wherein the etching stoppers are an oxide film.

8. A method according to claim 6, wherein the one conductivity type is n type.

9. A method according to claim 6, wherein the one conductivity type is p type.

10. A method according to claim 6, wherein the semiconductor device is at least one electronic equipment selected from the group consisting of a sensor, a scanner, and a copy machine.

11. A method according to claim 6, wherein the semiconductor device is at least one electronic equipment selected from the group consisting of a video camera, a digital camera, a laptop computer, a portable information terminal, a mobile computer, a mobile telephone, a mobile game equipment, and an electronic book.

12. A method of manufacturing a semiconductor device comprising:

forming a first semiconductor on an insulating surface;

forming a first insulating film on the first semiconductor;

simultaneously patterning the first semiconductor and the first insulating film to form a plurality of second semiconductors and a plurality of second insulating films;

forming a third semiconductor on the second insulating films;

forming a fourth semiconductor on the third semiconductor;

simultaneously patterning the third and fourth semiconductors while using the second insulating films as etching stoppers to form fifth and sixth semiconductors;

forming a third insulating film on the second, fifth, and sixth semiconductors;

forming a plurality of gate electrodes only on the third insulating film that is in contact with the second semiconductors;

doping the second and sixth semiconductors with an impurity element that gives one conductivity type to form first impurity regions; and

doping the second and sixth semiconductors with an impurity element that gives an opposite conductivity type using masks formed on the second, fifth, and sixth semiconductors in order to form second impurity regions.

13. A method according to claim 12, wherein the etching stoppers are an oxide film.

14. A method according to claim 12, wherein the one conductivity type is n type.

15. A method according to claim 12, wherein the one conductivity type is p type.

16. A method according to claim 12, wherein the semiconductor device is at least one electronic equipment selected from the group consisting of a sensor, a scanner, and a copy machine.

17. A method according to claim 12, wherein the semiconductor device is at least one electronic equipment selected from the group consisting of a video camera, a digital camera, a laptop computer, a portable information terminal, a mobile computer, a mobile telephone, a mobile game equipment, and an electronic book.

18. A method of manufacturing a semiconductor device comprising:

forming a plurality of first semiconductor islands and a plurality of second semiconductor islands over a substrate;

forming a first insulating film on the first and second semiconductor islands;

forming a plurality of gate electrodes over the first semiconductor islands;

doping the first semiconductor islands and at least one of the second semiconductor islands with an impurity element that gives one conductivity type to form a first impurity region;

doping some of the first semiconductor islands and another second semiconductor islands with an impurity element that gives an opposite conductivity type to form a second impurity region;

forming a second insulating film over the first and second semiconductor islands;

forming contact holes in the second insulating film so that the contact holes reach the first and second impurity regions;

forming wiring lines that are connected to the first and second impurity regions, and then removing a part of the metal film; and

forming an amorphous semiconductor so as to be in contact with both of

the first and second impurity regions of the second semiconductor islands,

wherein the first semiconductor islands are active layers of thin film transistors formed over the substrate, and

wherein the amorphous semiconductor is a photoelectric conversion layer of the photoelectric conversion element formed over the substrate.

19. A method according to claim 18, wherein the one conductivity type is n type and the opposite conductivity type is p type.

20. A method according to claim 18, wherein the semiconductor device is at least one electronic equipment selected from the group consisting of a sensor, a scanner, and a copy machine.

21. A method according to claim 18, wherein the semiconductor device is at least one electronic equipment selected from the group consisting of a video camera, a digital camera, a laptop computer, a portable information terminal, a mobile computer, a mobile telephone, a mobile game equipment, and an electronic book.

22. A method of manufacturing a semiconductor device comprising:

forming a semiconductor film over a substrate

forming a first insulating film on the semiconductor film;

simultaneously patterning the semiconductor film and the first insulating film to form at least first, second, third and fourth semiconductor islands and a plurality of second insulating layers;

forming a semiconductor pattern partially overlapped with the second

insulating layers over the third and forth semiconductor islands, thereby the second insulating layers over the first and second semiconductor islands are removed;

forming a third insulating film over first, second, third and fourth semiconductor islands and the semiconductor pattern;

forming a plurality of gate electrodes over the first and second semiconductor islands and the semiconductor pattern with the third insulating film interposed therebetween;

doping the first and second semiconductor islands and selected portions of the third and fourth semiconductor islands with an impurity element that gives one conductivity type to form first impurity regions; and

doping the second semiconductor island and the selected portion of the fourth semiconductor island with an impurity element that gives an opposite conductivity type to form second impurity regions.

23. A method according to claim 22, wherein the first and second semiconductor islands are active layers of thin film transistors formed over the substrate, and wherein the third and fourth semiconductor islands and the semiconductor pattern are comprised in a photoelectric conversion element formed over the substrate.

24. A method according to claim 22, wherein the one conductivity type is n type and the opposite conductivity type is p type.

25. A method according to claim 22, wherein the semiconductor device is at least one electronic equipment selected from the group consisting of a sensor, a scanner, and a copy machine.

26. A method according to claim 22, wherein the semiconductor device is at least one electronic equipment selected from the group consisting of a video camera, a digital camera, a laptop computer, a portable information terminal, a mobile computer, a mobile telephone, a mobile game equipment, and an electronic book.